1. Add the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = 3x^3 + 8x + 5 \text{ and } g(x) = \sqrt{-5x - 18}$$

A. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-7.6, 1.4]$

B. The domain is all Real numbers except $x = a$, where $a \in [-8.6, -3.6]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [4, 9]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [3.75, 10.75]$ and $b \in [1.2, 8.2]$

E. The domain is all Real numbers.

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2. Find the inverse of the function below. Then, evaluate the inverse at $x = 7$ and choose the interval that $f^-1(7)$ belongs to.

$$f(x) = \ln(x - 5) - 3$$

A. $f^{-1}(7) \in [22026.47, 22032.47]$

B. $f^{-1}(7) \in [162748.79, 162754.79]$

C. $f^{-1}(7) \in [58.6, 62.6]$

D. $f^{-1}(7) \in [22015.47, 22023.47]$

E. $f^{-1}(7) \in [-2.61, 10.39]$

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3. Determine whether the function below is 1-1.

$$f(x) = (4x + 22)^3$$

A. No, because the domain of the function is not $(-\infty, \infty)$.

B. Yes, the function is 1-1.

C. No, because the range of the function is not $(-\infty, \infty)$.

D. No, because there is an x-value that goes to 2 different y-values.

E. No, because there is a y-value that goes to 2 different x-values.

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4. Find the inverse of the function below. Then, evaluate the inverse at $x = 4$ and choose the interval that $f^{-}1(4)$ belongs to.

$$f(x) = e^{x-2} - 2$$

A. $f^{-1}(4) \in [-0.26, 0.56]$

B. $f^{-1}(4) \in [-2.74, -0.56]$

C. $f^{-1}(4) \in [-0.26, 0.56]$

D. $f^{-1}(4) \in [-2.74, -0.56]$

E. $f^{-1}(4) \in [3.68, 4.18]$

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5. Determine whether the function below is 1-1.

$$f(x) = 9x^2 + 126x + 441$$

A. No, because there is a y-value that goes to 2 different x-values.

B. No, because the range of the function is not $(-\infty, \infty)$.

C. No, because there is an x-value that goes to 2 different y-values.

D. No, because the domain of the function is not $(-\infty, \infty)$.

E. Yes, the function is 1-1.

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6. Choose the interval below that f composed with g at $x = 1$ is in.

$$f(x) = 3x^3 + 2x^2 - 4x \text{ and } g(x) = 3x^3 + 2x^2 - 4x + 1$$

A. $(f \circ g)(1) \in [-13, -3]$

B. $(f \circ g)(1) \in [21, 25]$

C. $(f \circ g)(1) \in [16, 21]$

D. $(f \circ g)(1) \in [1, 4]$

E. It is not possible to compose the two functions.

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7. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = x^3 - 2x^2 - x + 2 \text{ and } g(x) = -x^3 + 4x^2 + x$$

A. $(f \circ g)(-1) \in [35, 40]$

B. $(f \circ g)(-1) \in [29, 31]$

C. $(f \circ g)(-1) \in [-4, 1]$

D. $(f \circ g)(-1) \in [7, 18]$

E. It is not possible to compose the two functions.

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8. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -14$ and choose the interval that $f^-1(-14)$ belongs to.

$$f(x) = \sqrt[3]{5x - 4}$$

A. $f^{-1}(-14) \in [547, 548.6]$

B. $f^{-1}(-14) \in [-551.3, -548.6]$

C. $f^{-1}(-14) \in [-548.6, -546.7]$

D. $f^{-1}(-14) \in [549, 552.1]$

E. The function is not invertible for all Real numbers.

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9. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -15$ and choose the interval that $f^-1(-15)$ belongs to.

$$f(x) = 3x^2 - 4$$

A. $f^{-1}(-15) \in [2.27, 2.72]$

B. $f^{-1}(-15) \in [2.73, 3.19]$

C. $f^{-1}(-15) \in [5.61, 6.24]$

D. $f^{-1}(-15) \in [1.77, 2.01]$

E. The function is not invertible for all Real numbers.

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10. Subtract the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \frac{3}{3x - 14} \text{ and } g(x) = 2x^2 + 3x + 7$$

A. The domain is all Real numbers except $x = a$, where $a \in [3.67, 13.67]$

B. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-8.67, -1.67]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-3, 0]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [2.67, 6.67]$ and $b \in [-4.67, 1.33]$

E. The domain is all Real numbers.
